TABLE E-1. AVERAGE ACHIEVEMENT OF BLACK AND OTHER STUDENTS IN THE NLS AND HSB, BY SUBJECT

Category	1972	1980	Change
Vocabulary			
Black	3.28	3.20	-0.08
Other <u>a</u> /	7.04	6.22	-0.82 <u>b</u> /
Reading			
Black	5.94	5.56	-0.38
Other <u>a</u> /	10.51	9.57	-0.94 <u>b</u> /
Mathematics			
Black	6.50	6.69	0.19
Other <u>a</u> /	13.90	12.97	-0.93 <u>b</u> /

SOURCE:

Rock and others, Factors Associated with Decline of Test Scores, Tables D-1, D-2, and D-3.

- a. "Other" category includes non-Hispanic whites, Asian Americans, and American Indians.
- b. Statistically significant at the .05 level or less.

The National Assessment of Educational Progress (NAEP)

The gap between black and nonminority students also narrowed at all three ages tested in the NAEP (see Tables E-2 and E-3). Moreover, this narrowing appeared quite consistently in both the top and bottom achievement quartiles (see Table D-1 in Appendix D). In some cases, both groups lost ground, but nonminority students lost more; in others, both blacks and nonminority students gained, but blacks gained more. In some instances, black scores increased while the nonminority average declined. Although not presented in detail here, NAEP assessments in the areas of social studies and writing also showed a narrowing of the gap among 9- and 13-year-olds.

TABLE E-2. READING PERFORMANCE OF BLACK AND NONMINORITY STUDENTS IN THE NATIONAL ASSESSMENT (Average percent of items answered correctly and proficiency scores)

	1970	1974	1979	1983	Change 1970-1979
	P	ercent Cor	rect		
Age 9		•			
Nonminority <u>a</u> /	66.4	67.0	69.3	NA	2.8
Black	49.7	54.5	59.6	NA	9.9
Age 13					
Nonminority <u>a</u> /	62.6	61.9	62.6	NA	.0
Black	45.4	46.5	49.6	NA	4.2
Age 17					
Nonminority a/	71.2	71.2	70.6	NA	-0.7
Black	51.7	52.1	52.2	NA	0.5
	Pr	oficiency S	Scores		
Age 9					
Nonminority <u>b</u> /	214.4	215.9	219.7	220.1	5.7
Black	169.3	181.9	188.9	188.4	19.1
Age 13					
Nonminority b/	260.1	260.9	263.1	263.4	3.3
Black	220.3	224.4	231.9	236.8	16.5
Age 17					
Nonminority b/	290.4	290.7	291.0	294.6	4.2
Black	240.6	244.0	246.1	263.5	22.9

SOURCES:

National Assessment of Educational Progress, Three National Assessments of Reading: Changes in Performance, 1970-1980 (Denver: NAEP/Education Commission of the States, 1981), Tables A-1, A-5, and A-9, and The Reading Report Card: Progress Toward Excellence in Our Schools (Princeton: NAEP/Educational Testing Service, 1985), Data Appendix.

NOTE:

NA denotes not available.

- a. Includes Hispanics in all years. See footnote 9.
- b. Includes Hispanics in 1970 only. See footnote 10.









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TABLE E-3. MATHEMATICS PERFORMANCE OF BLACK AND NONMINORITY STUDENTS IN THE NATIONAL ASSESSMENT a/
(Average percentage of items answered correctly)

Group	1972 (Estimated) <u>b</u> /	1977	1981	Change 1972-1981
Age 9				
Nonminority Black	60.1 40.2	58.1 43.1	58.8 45.2	-1.28 4.99
Age 13				
Nonminority Black	62.3 41.1	59.9 41.7	63.1 48.2	0.84 7.07
Age 17				
Nonminority Black	66.7 46.3	63.2 43.7	63.1 45.0	-3.56 -1.32

SOURCES:

CBO calculations based on National Assessment of Educational Progress, The Third National Mathematics Assessment: Results, Trends, and Issues (Denver: NAEP/Education Commission of the States, 1983), Table 5.1; and CBO calculations based on National Assessment of Educational Progress, Mathematical Technical Report: Summary Volume (Denver: NAEP/Educational Commission of the States, 1980), Tables 2, 3, and 4.

- a. Nonminority category excludes Hispanics in all years.
- b. These estimates for 1972 differ from published NAEP results for the 1972 assessment. The published results for that year are based either on the 1972 item pool or on the items used in both 1972 and 1977, while the trend results comparing the 1977 and 1981 assessments reflect items used in both the 1977 and 1981 assessments. In order to circumvent the large disparities in the item sets, 1972 results were estimated here by adjusting the 1977 results (on the items used in 1977 and 1981) by the 1972-to-1977 change (on the items used in 1972 and 1977).

On the other hand, in science, no clear narrowing of the gap was apparent. 8/

The NAEP provides a somewhat different view than the SAT of the magnitude of the achievement gap between black and nonminority students and of the rate at which that difference is shrinking. The NAEP, in contrast to the SAT, is designed to assess the degree to which students have mastered commonly taught material. Moreover, until recently, the NAEP was scaled in a way that is intuitively clearer--albeit less useful in some important respects--than the SAT; scores are typically presented as the average percent of items answered correctly by a given group of students. In the early 1970s, black students on average correctly answered about a third fewer items in math and a fourth fewer in reading than did their nonminority peers. 9/ For example, nonminority nine-year-olds averaged 60 items correct in mathematics, compared with about 40 items answered correctly by the average black student. In proportional terms, these differences were quite similar in all three age groups tested.

Throughout the 1970s, differences between black and nonminority students in NAEP scores shrank more rapidly among elementary and junior-high students than among high school students. Among nine-year-olds, the average black student's mathematics score was roughly a fourth below the average nonminority score in 1981, compared with a third below in 1972. In reading, the average black score went from a fourth below the



^{8.} See Nancy W. Burton and Lyle V. Jones, "Recent Trends in Achievement Levels of Black and White Youth," Educational Researcher, vol. 11 (April 1982), pp. 10-14, 17. Burton and Jones suggest that the racial gap has narrowed in science as well, but that change appears largely to be an artifact of differences in the content of the tests given in different pairs of years. When the 1972-1976 change in racial differences on the item set administered in both of those years is added to the 1969-1972 change on the set used in both of those years, the trend in the racial difference over the entire period considered is nearly zero. This can be seen from their Figures 4 and 5 and, more precisely, from Tables A-2, A-3, and A-4 in National Assessment of Educational Progress, Three National Assessments of Science.

^{9.} In these reading data, Hispanics are included in the nonminority category (National Assessment of Educational Progress, Three National Assessments of Reading, p. 2). While including Hispanics in the nonminority category lowers the average score of that group, its effect on the trends is unclear. On the one hand, the relative gains of Hispanic students during that period-described subsequently-would make the trends in the nonminority group more favorable and thus attenuate the comparative gains among blacks. On the other hand, the growth of the Hispanic share of the school-age population would make trends in the nonminority group less favorable and thus exaggerate the relative gains of blacks. In contrast, in the mathematics data, Hispanic students are separated (National Assessment of Educational Progress, Changes in Mathematical Achievement, 1973-78, p. 29).

nonminority score in 1970 to less than 15 percent below in 1979. The gap narrowed slightly less among 13-year-olds and very little among 17-year-olds.

In the most recent (1983) reading assessment, NAEP scores are reported in terms of "proficiency scores" that permit comparison of the performance of students in different age groups--providing yet another way of gauging the gap between black and non-minority students. Through the 1979 assessment, these data reveal the same pattern noted above, with one addition--through 1979, black 17-year-olds were on average less proficient in reading than nonminority 13-year-olds (see Figure IV-5 in Chapter IV). 10/

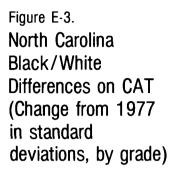
Since 1979, these new NAEP data indicate that the closing of the gap between black and nonminority students accelerated among 17-year-olds while ending among nine-year-olds. (Because of the large gains among black 17-year-olds, the average performance in the groups reached the level of the average among nonminority 13-year-olds for the first time.) This pattern makes sense in terms of a cohort model; in both age groups, the black students born in the mid-1960s contributed the most marked gains (see Figure IV-5 in Chapter IV). On the other hand, these trends among 17-year-olds are inconsistent with the SAT data, which show the relative gains of black students ending in the last few years.

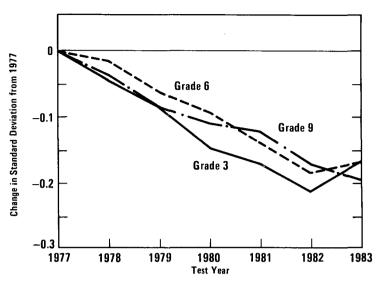
State-Level Data

Statewide assessments from two states, North Carolina and Texas, provide trend data separately for black and nonminority students, and both show a narrowing of the gap between the two groups. The North Carolina statewide assessment program provides average scores of black and white students on a standardized achievement test (the CAT) since 1977. In all three grades tested (3, 6, and 9), the gap has narrowed considerably (see Figure E-3).11/

^{10.} In these tabulations, Hispanics are included in the white (or nonminority) category only in 1970 (National Assessment of Educational Progress, The Reading Report Card, Data Appendix). Their being included only in the base year and excluded thereafter exaggerated the improvement among whites, thus attenuating the relative gains of black students.

^{11.} The trends in Figure E-3 were calculated using the total standard deviation from the 1977 norming sample for the California Achievement Tests (California Achievement Tests, Forms C and D, Technical Bulletin 1 (Monterey: CTB/McGraw-Hill, 1978), Table 8). If standard deviations based on the North Carolina data were available, their use would have altered the specific numbers in Figure E-3, but the differences most likely would have been relatively small, and the convergence of black and white students' scores would still be apparent.





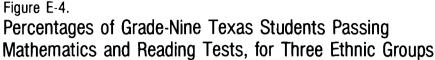
SOURCES: CBO calculations based on North Carolina State Department of Education, unpublished tabulations, and California Achievement Tests, Form C and D: Technical Bulletin 1 (Monterey: CTB/McGraw-Hill, 1979).

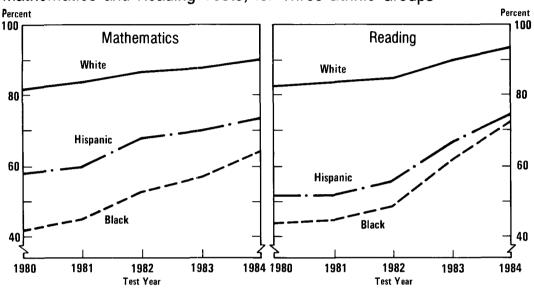
Black ninth-grade students have also improved their average achievement on the Texas statewide mathematics and reading tests more rapidly than have nonminority students during the few years for which data are available (see Figure E-4). 12/

HISPANIC STUDENTS

As noted in Chapter IV, trend data about Hispanic students are sparser than those about black students, and their meaning is clouded by inconsistencies

^{12.} The Texas scores are tabulated as percentages of students in each group exceeding a specific criterion score. Since the proportion of white students exceeding the criterion is very high, the convergence of the scores of black and nonminority scores may in part reflect a "ceiling effect"--that is, the fact that the success rate among nonminority students cannot rise much more. Even after a mathematical correction of this problem (normalizing the proportions with a logit transformation), however, the gap appears to be narrowing appreciably, albeit at a slower rate than in the unadjusted data presented in Figure E-4.





SOURCE: W. James Popham, Keith L. Cruse, Stuart C. Rankin, Paul D. Sandifer, and Paul L. Williams, "Measurement-Driven Instruction: It's on the Road," *Phi Delta Kappan*, vol. 66 (May 1985), pp. 628-634.

in the categorization of Hispanics and differences among various Hispanic groups. In addition, the small number of Hispanic students in many sources of data leads to instability and unreliability in estimates of trends within that group--a problem that is exacerbated when the scores of Hispanic students are reported separately for different Hispanic groups, such as Mexican Americans and Puerto Ricans. 13/ Given that unreliability, consistency of the trends among a variety of tests is particularly important.

Of the five data sources used in this report that provided trend data on Hispanic students, all but one showed a clear narrowing of the gap between nonminority students and at least one Hispanic group. The sole exception is local data from the Montgomery County (Maryland), public schools, which showed slight and not entirely consistent increases in the size of the gap. 14/

^{13.} Average scores of various Hispanic subgroups could be pooled, but the differences in both achievement levels and recent trends among these groups--documented in this Appendix--argue against that approach when separate tabulations are available.

^{14.} Montgomery County (Maryland) Public Schools, "MCPS Test Results by Racial/Ethnic Groups, 1977-1982" (unpublished, 1982).

The SAT

College Board data distinguish between two Hispanic groups: Mexican Americans and Puerto Ricans.

The narrowing of the gap between Mexican-American and nonminority students has been fairly consistent since the first year of data and appears on both scales (see Figure E-1). Over the full nine years of data, the convergence of scores between Mexican-American and nonminority students is 75 percent or 80 percent as great as that between blacks and non-minority students. As in the case of blacks, the convergence was a bit greater on the mathematics scale than on the verbal scale. The trend among Mexican Americans also parallels that among blacks, in that the relative gains appear to have ended or tapered off in the past few years. The year-to-year fluctuations in the Mexican-American students' scores, however, call this short-term pattern into question.

Puerto Rican students also showed gains relative to nonminority students, but in this case, the gains were both small and far less consistent from year to year, perhaps partly because of the relatively small number of Puerto Rican students taking the SAT (see Figure E-1). The relative gains of Puerto Rican students parallel those of blacks and Mexican Americans in being greater in mathematics than on the verbal scale. On both scales, however, their relative gains were only about 40 percent as large as those of black students over the full nine years.

The NLS and HSB

The NLS/HSB comparison shows relative gains among both Mexican-American and other Hispanic students in all three subjects tested (reading, vocabulary, and mathematics), with Mexican-American students showing a larger relative gain in vocabulary (see Table E-4). With the exception of the vocabulary gains by Mexican Americans, the relative gains of Hispanics were much smaller than those of black students. All of these patterns, however, are open to question, because the Hispanic sample sizes are small. For that reason, even fairly striking changes are not significantly different--in a statistical sense--from no change.

The National Assessment of Educational Progress

The NAEP data show an entirely consistent pattern of relative gains by Hispanic students (not further separated into subgroups) in both reading and

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TABLE E-4. AVERAGE ACHIEVEMENT OF HISPANIC AND OTHER STUDENTS IN THE NLS AND HSB, BY SUBJECT

Group	1972	1980	Change
	Vocabulary		
Mexican American Other Hispanic Other <u>a</u> /	3.47 4.36 7.04	3.50 3.71 6.22	0.03 -0.65 -0.82 <u>b</u> /
	Reading		
Mexican American Other Hispanic Other <u>a</u> /	$6.28 \\ 6.49 \\ 10.51$	5.60 5.72 9.57	-0.69 -0.77 -0.94 <u>b</u> /
	Mathematics		
Mexican American Other Hispanic Other <u>a</u> /	8.02 7.48 13.90	7.54 7.90 12.97	-0.48 -0.41 -0.93 <u>b</u> /

SOURCE:

Rock and others, Factors Associated with Decline of Test Scores, Tables D-1, D-2, and D-3.

NOTE:

Components might not sum to totals because of rounding.

- a. "Other" category includes non-Hispanic whites, Asian Americans, and American Indians.
- b. Statistically significant at the .05 level or less.

mathematics--the only subjects for which such comparisons have been made available (see Tables E-5 and E-6). These relative gains are apparent in all three age groups and during periods of both increasing and decreasing scores. They are generally, but not in every case, smaller than those of black students. 15/

The Texas State Assessment

The data from the Texas assessment of mathematics and reading achievement of ninth-grade students is consistent with the other data reported here. Hispanic students on average scored between black and non-minority students, although closer to black students. Moreover, like black students, they gained relative to the nonminority average (see Figure E-4).

^{15.} Note that in reading, the relevant comparison is the change in blacks' scores from 1974 to 1983, not the change from 1970 that is tabulated in Table E-2. Scores for Hispanics are not available from the 1970 assessment.

TABLE E-5. MATHEMATICS PERFORMANCE OF
NONMINORITY AND HISPANIC STUDENTS
IN THE NATIONAL ASSESSMENTS
(Average percentage of items answered correctly) a/

	1972 (Estimated) <u>b</u> /	1977	1981	Change 1972-1981
Age 9				
Nonminority <u>a</u> / Hispanic	60.1 46.1	58.1 46.6	58.8 47.7	-1.28 1.65
Age 13				
Nonminority <u>a</u> / Hispanic	62.3 48.4	59.9 45.4	63.1 51.9	0.84 3.52
Age 17				
Nonminority <u>a</u> / Hispanic	66.7 50.8	63.2 48.5	63.1 49.4	-3.56 -1.42

SOURCE:

CBO calculations based on National Assessment of Educational Progress, The Third National Mathematics Assessment: Results, Trends, and Issues, Table 5.1; and Mathematical Technical Report: Summary Volume Tables 2, 3, and 4.

- a. Nonminority is non-Hispanic white, labeled "white" in the cited sources.
- b. These estimates for 1972 differ from published NAEP results for the 1972 assessment. The published results for that year are based either on the 1972 item pool or on the items used in both 1972 and 1977, while the trend results comparing the 1977 and 1981 assessments reflect items used in both the 1977 and 1981 assessments. In order to circumvent the large disparities in the item sets, 1972 results were estimated here by adjusting the 1977 results (on the items used in 1977 and 1981) by the 1972-to-1977 change (on the items used in 1972 and 1977).

TABLE E-6. READING PERFORMANCE OF NONMINORITY AND HISPANIC STUDENTS IN THE NATIONAL ASSESSMENTS (Average proficiency scores)

Group	1974	1979	1983	Change 1974-1983
Age 9				
Nonminority <u>a</u> / Hispanic	215.9 182.9	219.7 189.1	220.1 193.0	4.2 10.1
Age 13				
Nonminority <u>a</u> / Hispanic	260.9 231.1	263.1 236.0	263.4 239.2	2.5 8.1
Age 17				
Nonminority <u>a</u> / Hispanic	290.7 254.7	291.0 261.7	294.6 268.7	3.9 14.0

SOURCE:

National Assessment of Educational Progress: The Reading Report Card: Progress Toward Excellence in our Schools, Data Appendix.

a. Nonminority is non-Hispanic white, labeled "white" in the cited source.